USER GUIDE

SCC-DI01 Isolated Digital Input Module

The SCC-DI01 is a single-channel, optically isolated digital input module that can sense AC and DC digital signals, including TTL, up to 30 VDC or 30 VAC.

Conventions

The following conventions are used in this guide:

» The **»** symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.

This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash. When this symbol is marked on the product, see the *Read Me First: Safety and Radio-Frequency Interference* document, shipped with the product, for precautions to take.

This icon denotes a note, which alerts you to important information.

When symbol is marked on a product it denotes a warning advising you to take precautions to avoid electrical shock.

When symbol is marked on a product it denotes a component that may be hot. Touching this component may result in bodily injury.

bold Bold text denotes items that you must select in software, such as menu items and dialog box options. Bold text also denotes parameter names.

italic Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

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`monospace`	Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.
SC-2345	SC-2345 refers to both the SC-2345 connector block and the SC-2345 with configurable connectors.
SCC	SCC refers to any SCC Series signal-conditioning module.

What You Need to Get Started

To set up and use the SCC-DI01, you need the following items:

- ❑ SC-2345/2350 with one of the following:
  - SCC-PWR01
  - SCC-PWR02 and the PS01 power supply
  - SCC-PWR03 (requires a 7 to 42 VDC power supply, not included)
- ❑ One or more SCC-DI01 modules
- ❑ *SC-2345/2350 User Manual*, available at `ni.com`
- ❑ *SCC-DI01 Isolated Digital Input Module User Guide*
- ❑ *SCC Quick Start Guide*, available at `ni.com`
- ❑ *Read Me First: Safety and Radio-Frequency Interference*
- ❑ SC-2345 Quick Reference Label
- ❑ 68-pin E Series DAQ device, documentation, and 68-pin cable of less than 2 m length
- ❑ 1/8 in. flathead screwdriver
- ❑ Numbers 1 and 2 Phillips screwdrivers
- ❑ Wire insulation strippers
- ❑ NI-DAQ (current version) for Windows 2000/NT/XP/Me

Note The Macintosh operating system is not supported.

Device Specific Information

Note For general SCC module installation and signal connection information, and information about the SC-2350 carrier, refer to the *SCC Quick Start Guide*, available for download at `ni.com/manuals`.

Installing the Module

Caution Refer to the *Read Me First: Safety and Radio-Frequency Interference* document before removing equipment covers or connecting/disconnecting any signal wires.

Plug the SCC-DI01 into any digital input/output socket J(*X*+9), where *X* is 0 to 7, on the SC-2345. When you follow the procedure in the *SCC Quick Start Guide*, the SC-2345 routes the digital input signal to channel P0.(*X*) on the E Series DAQ device.

Connecting the Input Signals

Note The signal names have changed. Refer to `ni.com/info` and enter `rdtntg` to confirm the signal names.

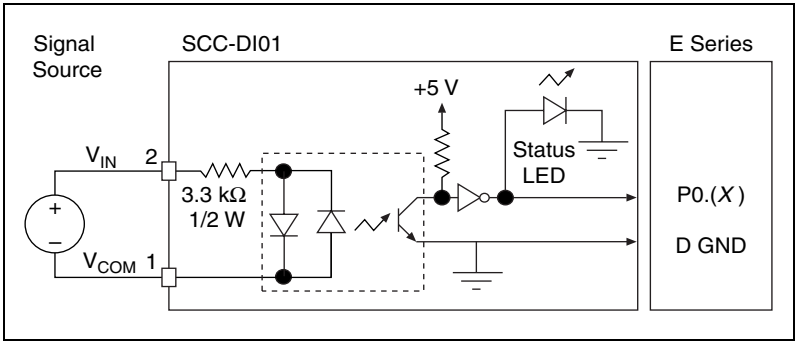


Figure 1. SCC-DI01 Signal Connections

For information about how to configure the SCC-DI01 module using NI-DAQmx, refer to the *SCC Quick Start Guide*.

Specifications

These specifications are typical at 25 °C unless otherwise stated.

Input Characteristics

Number of channels.....1

Maximum input voltage.....30 VDC or 30 VAC

Digital logic levels

Level	Min	Max
Input low voltage (DC or Peak AC)	—	±1 V
Input high voltage DC 1 kHz AC	 ±2 VDC 4 V_{rms}	 ±30 VDC 30 VAC

Input current

5 V input.....1.5 mA

24 V input.....7.0 mA

Isolation .....42 VDC from computer ground

Propagation delay

Low to high.....10 µs[1]

High to low .....250 µs[1]

Rise time .....10 ns max

Fall time.....10 ns max

Power Requirement

Digital power .....61 mW max

Physical Characteristics

Dimensions .....8.89 cm × 2.92 cm × 1.85 cm
(3.50 in. × 1.15 in. × 0.73 in.)

Mass.....28.6 g (1.0 oz)

[1] The switching characteristics (turn-on time, switching time, and turn-off time) of the optical isolator used on the board limit the data transfer rate.

I/O connectors ..... One 20-pin right-angle male connector; one 2-pin screw terminal

Field-wiring diameter..... 28 to 16 AWG

Maximum Working Voltage

Maximum working voltage refers to the signal voltage plus the common-mode voltage.

Channel to earth ..... 42 V, Installation Category 2

Module to module ..... 42 V, Installation Category 2

Environmental

Operating temperature..... 0 to 50 °C

Storage temperature ..... –20 to 70 °C

Humidity ..... 10 to 90% RH, noncondensing

Maximum altitude ..... 2,000 m

Pollution Degree (indoor use only)..... 2

Safety

The SCC-DI01 meets the requirements of the following standards for safety and electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 3101-1, UL 61010B-1
- CAN/CSA C22.2 No. 1010.1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/hardref.nsf`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

Emissions.....EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

Immunity .....EN 61326:1997 + A2:2001, Table 1

CE, C-Tick, and FCC Part 15 (Class A) Compliant

Note For full EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

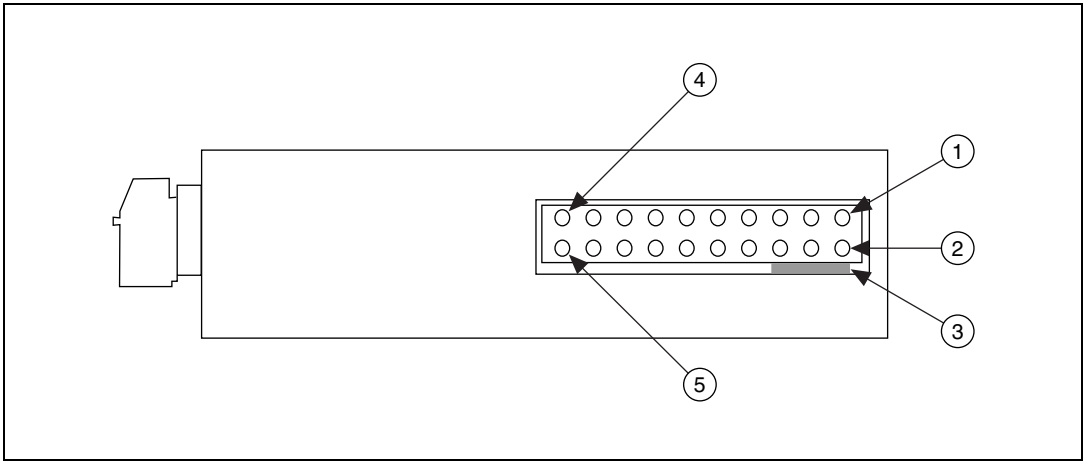
Low-Voltage Directive (safety).....73/23/EEC

Electromagnetic Compatibility
Directive (EMC).....89/336/EEC

Note Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit `ni.com/hardref.nsf`, search by model number or product line, and click the appropriate link in the Certification column.

I/O Connector Pin Assignments

Figure 2 shows the I/O connector pins on the bottom of the module.



1 Pin 1 2 Pin 2 3 PWB Key 4 Pin 19 5 Pin 20

Figure 2. SCC Module Bottom View

Table 1 lists the signal connection corresponding to each pin. GND is the reference for the +5 V supply.

Table 1. SCC-DI01 Module Pin Assignments

Pin Number	Signal Name
1	—
2	—
3	—
4	—
5	—
6	—
7	P0.(*X*)
8	—
9	+5 V
10	GND
11	—

Table 1. SCC-DI01 Module Pin Assignments (Continued)

Pin Number	Signal Name
12	—
13	—
14	—
15	—
16	—
17	—
18	—
19	—
20	—

Theory of Operation

Power-Up Condition

At power-up, the SCC-DI01 registers a logic low if there are no connections to the inputs.

Status LED

The SCC-DI01 has a status LED that indicates when an input signal registers a logic high or a logic low. The LED is located above the screw terminals. If the LED is off, the input signal is registering a logic low on the digital line. If the LED is on, the input signal is registering a logic high on the digital line.

Sensing DC Voltages

The SCC-DI01 registers a logic high when a positive or negative DC voltage of 2 V or more exists across the screw terminals. If no voltage is present, the SCC-DI01 registers a logic low.

Sensing AC Voltages

The SCC-DI01 registers a logic high when an AC voltage exists across the screw terminals. Signals with low amplitude and low frequency cause the SCC-DI01 to register alternating logic highs and logic lows. Sinusoidal signals of 1 kHz or higher frequency and 4 V_{rms} or higher amplitude cause the SCC-DI01 to register a constant logic high.

Isolating Signals

The V_{IN} and V_{COM} signals are isolated from the inputs of other channels and are also isolated from the SCC-DI01 internal power and ground signals. The isolation barrier protects the SCC-DI01 and other equipment connected to it from voltages up to +42 VDC. Voltages higher than +42 VDC can damage the SCC-DI01 and other equipment.

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